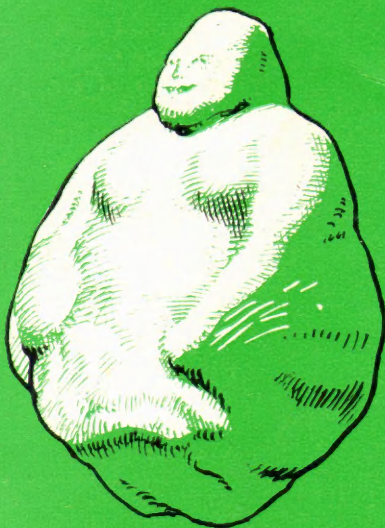


GRIME'S GRAVES

NORFOLK



Ministry of Public Building and Works

HMSO: 1s. 6d. NET

Grime's Graves may be reached by the roads A 1065 and B 1108 from Brandon station (3 miles S.W.); by A 134 and B 1108 from Thetford (5 miles S.E.); or from the left bank of the Little Ouse at Santon Downham (1¼ miles S.) O.S. map reference TL816898

NOTE

Visitors wishing to crawl along the galleries are advised to wear old clothes and take an electric torch.

ACKNOWLEDGMENTS

The reconstruction drawings on pages 2, 16-17, 20, and 25 are the work of Alan Sorrell.

The aerial view on pages 6-7 is from the Cambridge University collection of Dr. J. K. St. Joseph.

The photographs on pages 13, 14, 15, and 26 were supplied by Hallam Ashley, New Costessey, Norwich, and the City of Norwich Museums.

The plan of Pit No. 15 on page 31 appeared with *The Pit Sanctuary at Grime's Graves*, by G. de G. Sieveking, in *British Museum Quarterly*, 1963, part 2.

The reference on page 3 to the earliest documentary evidence for the name "Grime's Graves" is due to Dr. O. K. Schram.

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MINISTRY OF PUBLIC BUILDING AND WORKS

GRIME'S GRAVES

NORFOLK

by the late

R. RAINBIRD CLARKE

M.A., F.S.A., F.M.A.

Director, City of Norwich Museums

LONDON

HER MAJESTY'S STATIONERY OFFICE

1963: Reprinted 1966



(*Opposite*)

Section drawing showing how a flint-mine was probably worked

GRIME'S GRAVES

Neolithic Flint Mines

"Grime's Graves" is the intriguing name of the largest and best known group of Neolithic flint-mines and associated flint-working sites in Britain. They lie on the gentle slopes of a dry valley in the Breckland of south-west Norfolk and are almost entirely surrounded by the plantations of the Forestry Commission, which screen them from the main roads linking the village of Mundford with Thetford and with Brandon. Grime's Graves occupy that eastern tip of the parish of Weeting which projects into Lynford and are situated about one mile north of the River Little Ouse, here the boundary between Norfolk and Suffolk. The ground surface of the mining area lies just below the 100-foot contour.

The name usually given to this site is Grime's Graves, though the alternative form of Grimmer's Graves is still current in the district. In the 18th century, the cup-shaped depressions which mark the shafts of some of the mines were called simply "The Holes". The earliest documentary reference so far discovered is in a rental of 1541/42, preserved in the Norwich Public Library, where the name "Grimesgraves" occurs in a list of sheepwalks characteristic of the economy of this area in medieval and later times. Although this record is as late as the 16th century, there is little doubt that the name originated long before that, and was probably given to the site by the Anglo-Saxons, to whom the purpose of these holes was obscure. Clearly they thought that the mines were connected with Woden, their chief god, when they attached to them the name "Grim". The suffix "Graves" bears no sinister implication of burial, but merely means "hollows" or "workings". The name "Grim" is also found in that of the Hundred of Grimshoe, in which Grime's Graves lie and where the Hundred Court is reputed to have met in medieval times.

The Exploration of the Site

The early antiquaries were as confused as the Anglo-Saxons about the true function of this site. The first to notice it was Gibson, who included a brief entry in his additions to Camden's *Britannia*, published in 1695. After mentioning Weeting Castle, he says somewhat inaccurately: "and at a mile's distance eastward, is a hill with certain small trenches or ancient fortifications, call'd *Gimes-graves*, of which name the inhabitants can give no account". This idea that the site had a military significance was developed by a local antiquary, the Rev. Francis Blomefield, in his *History of Norfolk* which first appeared in 1739. He wrote: "about the centre of this hundred, two miles east of *Weeting* . . . is a very curious *Danish* incampment, in a semi-circular form, consisting of about twelve acres, on the side of a hill or rising ground of marl or chalk. In this space are great numbers of large deep pits, joined in a regular manner, one near to another, in form of a *quincunx*, the largest seeming to be in the centre, where probably the general's or commander's tent was. These pits are dug so deep, and are so numerous, that they are capable not only of receiving a very great army, but also of covering and concealing them in such a manner, that travellers passing by cannot discern them; at the east end of this entrenchment (called by the neighbourhood, the Holes) is a large *tumulus*, pointing towards *Thetford*, . . . which perhaps might also have served as a watch-tower, or a place of signal; and here the *hundred court* used to be called."

For over a hundred years, antiquaries were content to reiterate these ideas until two local parsons, the Rev. C. R. Manning and the Rev. S. T. Pettigrew, attempted in 1852 to determine the date and purpose of the site by digging. Unfortunately these investigations were of a superficial character and the excavators mistook flint debris for a paved floor and concluded erroneously that each depression was the site of a hut and that "the place is, in fact, a British town – a fortified settlement of the Iceni, probably of a date anterior to the arrival of the Romans". Manning dug again in 1866 and his discovery of more animal bones and fireplaces only served to confirm his views. This interpretation of Grime's Graves as an Iron Age village might have remained the orthodox view among archaeologists for several generations but for the tenacity of purpose of another clerical archaeologist, Canon W. Greenwell.

In 1868 Greenwell began the excavation of a hollow near the south-eastern extremity of the area. In 1870, after three seasons' somewhat

hazardous digging, he was able to demonstrate triumphantly that this hollow was the infilled circular shaft of a flint-mine, dug in the Neolithic period. He recognised that "it was the place where a manufactory of flint implements had been carried on" and noted similar mining sites at Cissbury in Sussex and in Belgium. Greenwell and his colleagues dug to the bottom of the shaft, 40 feet below the modern surface, and penetrated into several galleries. They recorded that "the roof had given way about the middle of the gallery, and blocked up the whole width of it to the roof. On removing this, and when the end came in view, it was seen that the flint had been worked out in three places at the end. In the front of two of these hollows was laid a pick, the handle of each towards the mouth of the gallery, the tines pointing towards each other, showing, in all probability, that they had been used respectively by a right and left handed man. The day's work over, the men had laid down each his tool, ready for the next day's work; meanwhile the roof had fallen in, and the picks had never been recovered. It was a most impressive sight, and one never to be forgotten to look, after a lapse of, it may well be, 3,000 years, upon a piece of work unfinished, with the tools of the workmen still lying where they had been placed so many centuries ago".

It might have been thought that the work of Greenwell had settled once and for all the date and function of the site, but some forty years after his excavation, in 1912, a distinguished member of the archaeological staff of the British Museum, Mr. R. A. Smith, wrote a controversial article. On the evidence of the form and technique of the flint tools found at Grime's Graves and similar British sites, he suggested that the mining dated from the latter part of the Palaeolithic period or Old Stone Age and so was immeasurably older than Greenwell and others had thought. This challenge to orthodoxy was speedily taken up by the newly-founded Prehistoric Society of East Anglia, which decided to test the new theory by organising further excavations. These took place in the spring of 1914 under the direction of Dr. A. E. Peake, when two mines (Pits 1 and 2) were completely excavated and a number of flint-knapping sites were investigated. A comprehensive report by various specialists was published in the following year, but confusion only resulted. Pits 1 and 2 were similar to the shaft excavated by Greenwell, and the use of pottery and the employment of polished flint axes as mining tools, as well as the remains of animals and snail shells of post-glacial types, all suggested a Neolithic date for the mining. Smith, however, again stressed the similarities in form and



Aerial view of Grime's Graves showing



the infilled shafts of the flint-mines

technique between the worked flints from the site and those of undoubted Upper Palaeolithic date from France. At that time prehistorians placed undue emphasis on flints in dating a site and tended to overlook other types of evidence. This outlook prevailed among many of the amateur as well as professional archaeologists, who swooped down annually on Grime's Graves to carry out small-scale excavations. To account for this apparently contradictory evidence the theory was evolved of a long sequence of mining operations at Grime's Graves, starting in the Palaeolithic period and continuing for thousands of years into the Neolithic.

This theory seemed to acquire further support when, in 1923, Mr. A. L. Armstrong, the principal excavator, discovered on the valley slopes to the north of the visible mines the first of a group of shallow shafts without galleries, of which no trace was apparent on the surface (Pit 3). The simple character of this working was hailed as a "primitive" feature and regarded as early in date. In 1926 Armstrong reviewed "the Grime's Graves Problem in the Light of Recent Researches" and announced the discovery of yet another type of mine (Pit 8) which he classified as "intermediate". He then set out the theory of three phases of mining, characterised respectively by simple, intermediate and deep galleried pits, invented in that order. He regarded the commencement of mining in Upper Palaeolithic times as "extremely probable" and its cessation in Early Neolithic times as "probably correct".

Excavations continued almost every year until 1939, when the investigation of Pit 15 and the discovery there of a female chalk figurine provided a dramatic conclusion to 25 years' work. Each of these discoveries was fitted into this hypothetical development lasting "several thousands of years" between 10,000 B.C. and 2,000 B.C., as the official guide-book of 1936 recorded. Yet already in 1933 an article by two archaeologists, now Professor J. G. D. Clark and Professor S. Piggott, had shown that this view was quite untenable. They reviewed the discoveries at Grime's Graves and other flint-mining sites, and concluded that "all the evidence points to a Neolithic date for the main flint-mining activity in Britain, no earlier phase having been satisfactorily demonstrated".

Thus some sixty years after Greenwell's excavation, his pioneer views once again found favour with archaeologists. The Palaeolithic heresy which had bedevilled the Grime's Graves problem for a generation is now merely an episode in the history of antiquarian thought. But there are still many unsolved problems, and only further professional excavation can be

expected to elucidate such a complicated site, which has for so long been the resort of enthusiastic amateurs.



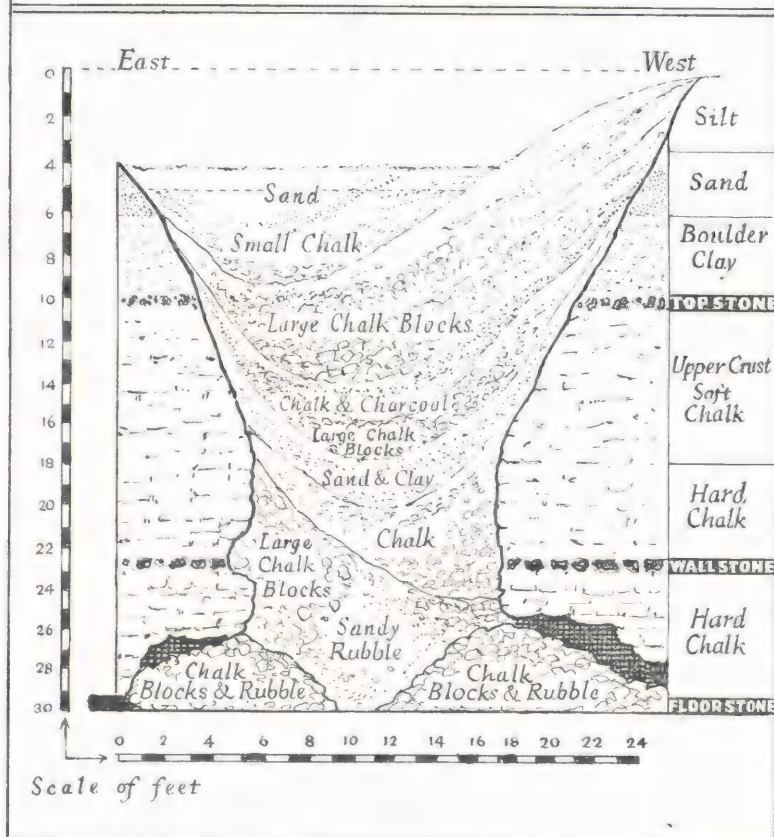
The Flint-mining Industry

It may reasonably be assumed that the first Neolithic flint-miners in East Anglia were already aware that flint occurs naturally in the chalk, and that some layers of it were more suitable than others for the making of tools. The best-quality flint, now known as "floorstone", is found in a zone of the chalk, just over five miles wide, which runs in a north and south direction through west Norfolk. Grime's Graves lies almost on the eastern boundary of this chalk zone and it is the presence of the "floorstone" which explains the intense exploitation of this site. The tabular "floorstone" lies almost horizontally in the hard chalk which fractures in large blocks. A few feet above the "floorstone", and in the same hard chalk, lie the inferior flint nodules termed "wallstone", occasionally worked by the miners. Above the hard chalk are some eight feet of softer chalk, in which occur scattered flints called "upper crust". At the junction of the soft chalk and the boulder clay which covers it, there is yet a further band of poor-quality flint, the "topstone", and above the boulder clay lie sand and humus.

Where all these deposits are present, as in the south-eastern area of the site, the miners had to penetrate sand, boulder clay, soft and hard chalk, besides hacking through three layers of inferior flint, to reach the coveted "floorstone" at a depth of 40 feet. Towards the north-west, in the area of Pit 1, this depth diminishes to about 30 feet, owing to the slope of the ground, and further north-west still, in the valley, all of these top deposits are missing and the "floorstone", contorted and broken by glacial action, is found in places within six inches of the modern surface. The variable depth of the "floorstone" in relation to the slope of the valley side is reflected in the types of mine sunk to exploit it.

The so-called "primitive" pits (Pits 3, 4, 5, 6, 7 and 13) have been identified only in a confined area believed to mark the northern limits of the site well down the valley slope. These simple open-cast workings are quite small, one being only 7 feet by 6 feet 3 inches at the lip, and relatively shallow, varying in depth from 11 feet 6 inches to 13 feet 4 inches. They have been dug through sand and boulder clay and some 6 feet of glaciated chalk before reaching the "floorstone". At the base, the chalk was undercut to extract as much flint as possible before the pit was abandoned. Traces of steps cut in the side were detected. Some of these pits were dug so close together that the chalk separating them was cut through at the base, thus linking the pits.

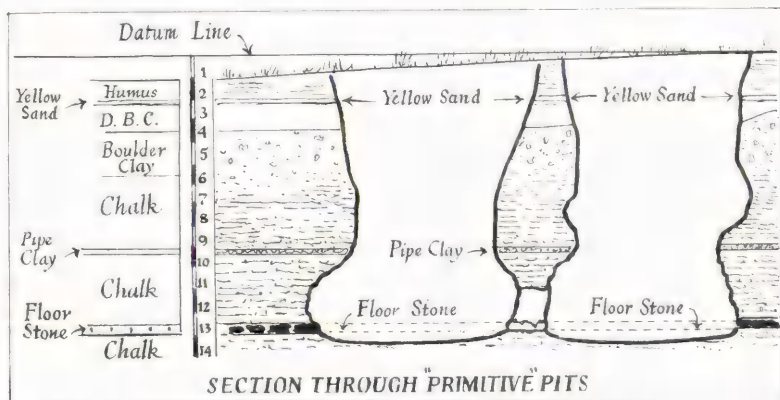
GRIME'S GRAVES
SECTION OF PIT NO. 1
showing various layers of infilling



Prior to their discovery by excavation there was no surface indication of these simple pits, and this is also true of the "intermediate" pits (Pits 8, 9, 10 and 11) which have been identified on or near the western boundary of the mined area. These are also open-cast workings, but have a greater diameter than the simple pits, one being 21 feet across. They vary in depth from 7 feet to 14 feet, according to the depth of the "floorstone", here lifted from its original position by glacial action. Slight coves have been

cut in the chalk at the base of these pits to extract more flint, but no galleries were detected.

The excavators assumed – perhaps rightly – that many other open-cast workings of “primitive” and “intermediate” types lie in this area of $17\frac{1}{2}$ acres in which no shafts are visible. But the discovery and excavation of Pits 12 and 14, both shafts with radiating galleries, shows that this area also contains an unknown number of examples of the third type of pit. These deep galleried shafts vary from 20 feet to 40 feet in depth, and the infilled shafts of no less than 366 examples have been recognised over a further $16\frac{1}{2}$ acres, thus making the total mined area about 34 acres in extent. Besides Pits 12 and 14, Canon Greenwell’s Pit and Pits 1, 2 and 15 belong to this type which would appear to have been the commonest form. The shafts are usually funnel-shaped in section, tapering in the case of Pit 2 from 42 feet in diameter at the surface to 14 feet at the bottom. From the base of each shaft, radiating galleries have been dug to extract the “floor-stone”, and some of these galleries communicate with those dug from the bases of adjacent shafts. No less than twenty-seven galleries have been identified leading from the bottom of Pit 1 to the bases of five other pit shafts, but of these galleries only nine are likely to represent the exploitation of flint directly from Pit 1. The main galleries, which are up to 7 feet in width and 5 feet in height, were sufficiently large for two miners to pass and high enough for a man with bent back to carry out chalk or flint. The smaller galleries vary in height between 2 feet and 3 feet and





Bottom of Pit 1, showing entrances to galleries

provided only sufficient space for the miner to lie prone when extracting the chalk and flint. The galleries are linked by small holes through which an adult can just crawl, and even smaller holes connect the galleries which were probably cut for ventilation.

The three types of mine, with their varying depths, are thus intimately linked with the position of the "floorstone". Where this lay close to the surface, simple open-cast pits either belled out at the base ("primitive" pits) or developed into coves ("intermediate" pits) were dug. These were not only more economical of labour than driving galleries but safer, as the glaciated chalk would have been positively dangerous for this purpose. Further up the slope, where the "floorstone" was deeper and the chalk harder, the amount of unproductive labour to reach it was correspondingly greater, and it was therefore desirable to extract as much flint as possible from one shaft by digging galleries – here a relatively safer procedure.



View inside a gallery of Pit 1

It would seem likely that the first miners opening up a new mine-field would locate the vein of flint at an outcrop and would exploit this by sinking open-cast pits. Later it would become necessary to follow the flint seam underground and drive vertical shafts with radiating horizontal galleries. The simple pits may therefore be slightly earlier than the deep mines, but it remains true that at Grime's Graves there is no discernible difference in date between the open-cast and galleried pits, and this is confirmed by the discovery of similar objects in both types of mine and by radio-carbon dates which demonstrate their contemporaneity.

Mining Technique

The first stage in digging a galleried mine was to excavate the sand and boulder clay from a circular area using a shovel. In some flint-mines the shoulder-blades of oxen were used for this purpose, but these have not been identified at Grime's Graves where wooden shovels were probably employed. A battered slope for the top stage of the pit was necessary to prevent material falling on the miners working below. When the hard chalk was reached it was safe to cut a more vertical side. The principal tool for removing chalk and flint was the antler of the red deer, though polished flint axes and occasionally imported stone axes were used to mine the toughest chalk, as can be seen from the cut-marks in the chalk sides of the galleries. In some of the open-cast pits the long bones of oxen (perhaps the wild aurochs) and at least one human femur were used, presumably hafted, as levers to remove chalk blocks. The antlers, of which 244 were found in Pits 1 and 2, were naturally shed or came from slaughtered red deer larger than modern British specimens. It has been estimated that over 50,000 antlers were used at Grime's Graves and this pre-supposes a

The layer of best-quality flint ("floorstone") at the base of Pit 1





How the miners

large deer population in the local woodlands and sufficient hunters to furnish a regular supply of antlers. After trimming these were probably used as levers by thrusting the brow tine into a natural line of fracture in the chalk and driving it home by the use of a flint hammerstone. In Pits 8 and 11 the antlers of roe deer were found and had apparently been used as rakes.

It is uncertain how the miners gained access to the bottom of the shafts and how they hauled the excavated flint and waste chalk to the surface. Steps were found at the top of the shallow open-cast pits, but an approach of this sort would have been impracticable in the deeper mines. Here grooves in the chalk at the junction of the galleries and the shaft suggest



Flint extracted

the possibility of rope ladders of plaited leather thongs with wooden treads. There is evidence that a horizontal beam or tree trunk was laid across the top of Pit 1. This suggests that the flint and chalk, placed in skin bags or possibly baskets, were hauled to the top on a rope and that the beam was used to prevent the load hitting the sides of the shaft. Graffiti over a gallery in Pit 2 have been regarded as tally marks recording the number of loads hauled to the surface, but this interpretation can only be guesswork.

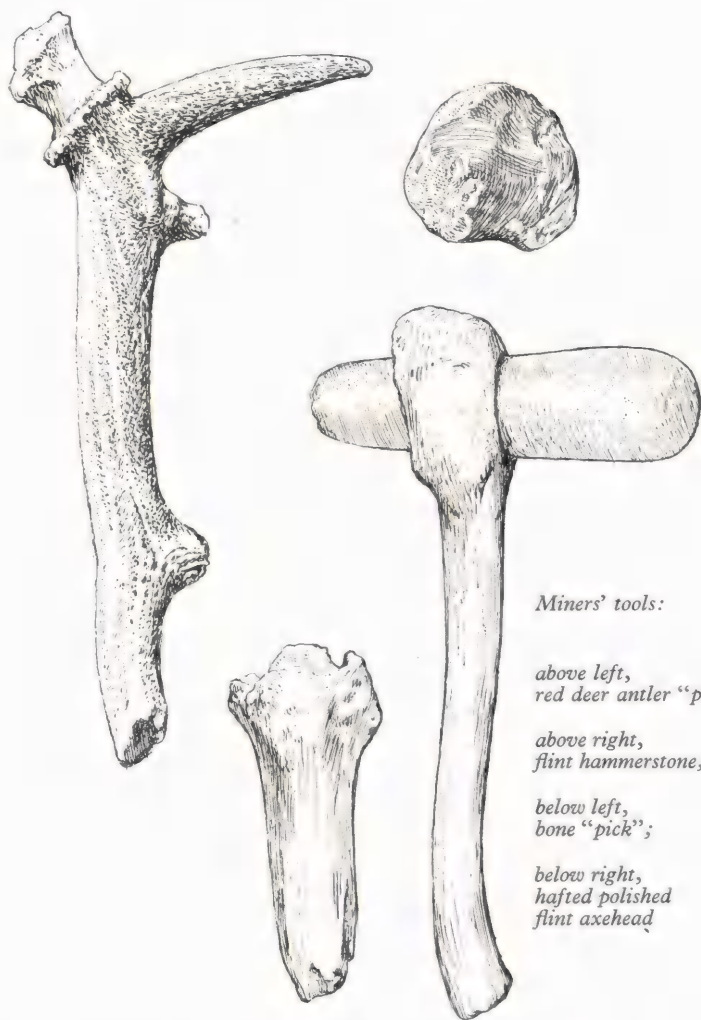
The material removed in excavating the shaft was probably tipped into the nearest abandoned mine-shaft, and fully exploited galleries were similarly filled with the waste chalk from galleries still in production in the

same mine. Illumination was necessary when working galleries distant from the shaft; and hollowed chalk "cups", filled with grease and a wick, were probably used as lamps. Four of these were found in Canon Greenwell's Pit, one each in Pits 1, 4 and 15 and several came from flint-knapping sites on the surface. Pottery cups may also have been used as lamps as well as torches, perhaps represented by charcoal found in the galleries.

It is impossible to state the length of time required to excavate and exploit a mine, as vital factors such as the number of men engaged, the number of hours worked each day and the working capacity of each miner must remain unknown, but it is perhaps permissible to hazard a guess. The volume of sand, chalk and flint removed from Pit 1 and the galleries re-excavated in 1914 has been calculated at approximately 10,000 cubic feet. If one assumes that each man moved only 20 cubic feet a day and that a team of at least three men was employed (one quarrying, one carrying to the base of the shaft and one hauling up the chalk or flint to the surface), then 166 working days would be adequate for the total exploitation of this mine. This is slightly less than the six months taken by one miner and a

Red deer antler "picks" abandoned by the miners in a gallery of Pit 2





Miners' tools:

*above left,
red deer antler "pick";*

*above right,
flint hammerstone;*

*below left,
bone "pick";*

*below right,
hafted polished
flint axehead*

boy apprentice to dig and work a flint-mine at Lingheath, Brandon, in the 20th century, and may be compared with the 20 working days taken by three men in 1914 to empty Pit 1, both admittedly using modern tools. A rough figure of six months for working out a galleried pit may therefore be taken as a reasonable guess.

The labour force engaged in exploiting one mine may well have been



Ritual ceremony among prehistoric flint-miners, who are presenting their antler "picks" to the goddess

larger than three, and it has been suggested that the seven antlers found on a heap of mined flint at the base of Pit 15 indicate the number of those working in that particular mine. But the number of those working on the site at any one time may have been several times greater than this, as the interconnection of several deep pits by galleries suggests that a number of pits were open at the same time. If we surmise that on an average three pits were dug each year by a labour force totalling nine, then the 700 to 800 pits in the whole mined area could have been exhausted in less than three centuries. The period of this activity is indicated by the radio-carbon dates obtained from objects found in Pits 10, 12, 14 and 15. The maximum possible range for these was from 2460 B.C. to 1720 B.C. and the mean of five separate calculations suggests the three centuries between 2208 B.C. and 1908 B.C. as the most probable.

The Miners

The working of the mines may have been a seasonal occupation during the summer months, coinciding perhaps with slack periods in the farming



*The chalk goddess;
and the base of Pit 15, showing
positions of the goddess and other ritual
objects*



year. But the skill required for successful mining tends to stamp the miners as professionals operating a centre of flint-working on a commercial scale rather than peasants providing for their own needs. This implies that the food and other requirements of the miners were provided by farmers and hunters in exchange for their products. While engaged in mining the workers may have dwelt in the nearby valley of the Little Ouse and travelled daily to the mines. Some of the potsherds and flint implements found in profusion round the site may have resulted from miners living there, but this material could also be interpreted as evidence for temporary encampments made during expeditions to the mines to acquire the axes they produced. It is one of the urgent requirements of future excavation to show if miners' huts existed near the pits.

The discovery of human bones in Pits 1, 2 and 12 might be taken as evidence that earlier burials had been disturbed by the digging of later mine-shafts. As one of the bodies represented was that of a girl of about 13 it could be inferred that miners' families visited them even if they did not dwell on the site. The use of a human femur as a tool, and the discovery of these remains thrust into an abandoned shaft, is not only evidence for a somewhat casual attitude towards the dead, but does not conflict with the deduction from other British and continental sites that the Neolithic population practised cannibalism for ritual or utilitarian purposes and discarded the unwanted portions of the human cadaver.

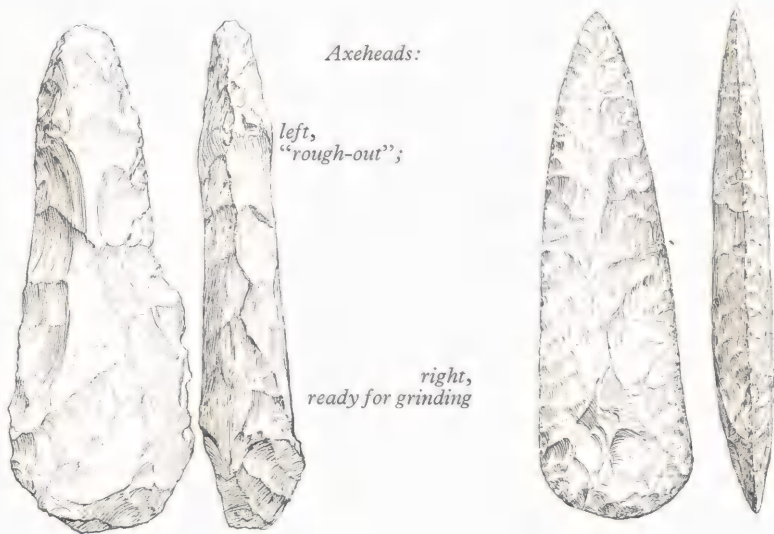
There is definite evidence for the practice of some form of ritual or magic from at least two of the galleried pits. Canon Greenwell found a number of chalk carvings in the shaft he excavated and among them was a representation of the glans of a human penis. A similar chalk phallus was found on Floor 46 and yet another with chalk balls was discovered in 1939 in the entrance to a gallery at the base of Pit 15. The sexual significance of these is emphasised by the obviously pregnant state of a female chalk figurine (4½ inches high) found a few feet away on a chalk pedestal. In front of her lay a triangular heap of blocks of mined flint, with a chalk lamp opposite. The seven red deer antlers which lay on this heap, presumably as offerings, have already been noted as a possible indication of the number of those engaged in this pit. This assemblage strongly suggests the propitiation of an "Earth Goddess" combined with an appeal for more abundant or better-quality flint in the next pit.

The discovery in 1914 of three antler "picks" lying in a straight line in gallery 1 of Pit 1 must have been the result of a deliberate act by the last

miners to vacate that working, but the possible ritual significance of the act can only be surmised. Hunting magic need not necessarily be invoked to explain the engravings found on flint crust on Floors 42, 75 and 85. The most complete is a finely scratched drawing of a red deer stag, doubtless as common a sight for the miners as it is now for the official custodian of Grime's Graves. These engravings are often mere doodles and may reflect the idle moments in the life of the miner or knapper rather than their spiritual aspirations.

The Axe Trade

It is uncertain if miners or specialised knappers carried out the process of trimming the blocks of flint into rough axes, for the production of these was the purpose of the whole vast enterprise. The process of knapping may have been continued by local farmers who came to the mines to acquire the rough-outs of axes which they themselves sharpened by



grinding. The presence of customers from different cultural groups from the miners (who used pottery of Windmill Hill type) is suggested by the discovery of many sherds of Peterborough and Rusticated Beaker wares on the flint-knapping floors. Whoever the knappers were, it is clear that the space round the mineheads and the sheltered shafts of partly infilled mines were used for tool-making. This is indicated by the profusion of waste flakes, partly finished implements, broken axes and other industrial waste found on these outdoor flint-knapping sites. This material comes mainly from "floors", sometimes nearly 5 feet thick, where the waste was thrown. These occur all over the mined area and beyond, and no less than 107 of them have been identified and excavated.

So far nothing has been said of the economic urge which led to the intensive activity of this axe-factory about 2000 B.C. Like other flint axe-factories, Grime's Graves came into existence in response to the demand of late Neolithic farmers for large numbers of flint axes, as an aid to deforestation in order to bring more land under cultivation. This was effected by the well-known "slash-and-burn" technique. The range of distribution of the Grime's Graves axes is unknown, but they are likely to have been confined to the surrounding area, as other regions doubtless derived their axes from the nearest local factory. In Breckland, the examination of pollen from the bed of the former Hockham Mere has shown that parts of this area supported fairly thick deciduous woodland in the Neolithic Age. This conclusion is confirmed by the charcoals found at Grime's Graves, by the presence in the area of red and roe deer and the aurochs – forest-loving species – and by the types of snails from the mines which indicate shade and moisture. The pollen from Hockham Mere has further revealed evidence of a diminution of the local woods at this time and its replacement by farmland. This important economic change must have affected the fauna of the district and led to further slaughter of the larger wild animals whose remains have been found at the mines. The only other animals definitely contemporary with the mining are ponies, voles, the common shrew, the mole and four species of bat. It is of interest to note that one of these species, the whiskered bat, has re-established itself in recent years in the pits now open to the public, after an absence of about 4,000 years.

The inception and development of flint-mining in England is linked firmly with the Windmill Hill culture and traces of it have been noted at other flint-mining sites such as Blackpatch, Cissbury, Harrow Hill and



Why the flint was mined

*Stages in making a
flint axehead*



*Felling a tree with a flint
axe to clear ground for
cultivation*



Harvesting a corn crop

Stoke Down in Sussex and at Easton Down in Wiltshire. It is probable that if adequate exploration were carried out at other flint-mine sites in Norfolk, such as Buckenham Tofts, Lynford, Massingham and Whitlingham, their close connection with the Windmill Hill culture would also be demonstrated.

It is uncertain, however, if the idea of flint-mining is a native British development evolved by the Windmill Hill folk after they had been in Britain for over a thousand years, or was introduced by fresh immigrants from the continent. If the former theory is correct this burst of flint-mining activity around 2000 B.C. could be explained as a native reaction to changes in the trading of stone axes from factories in the highland zone of Britain or to competition provided by newly introduced metal tools.

If, however, the idea of flint-mining was introduced at this time from the continent, then it is likely to have reached East Anglia from Belgium, Holland or Northern France. In this part of the continent many flint-mining sites are known and some present close technical similarities to Grime's Graves. Another possible source is Northern Europe, where

Engraving of red deer on flint crust



flint-mines have been recorded in Denmark, Southern Sweden and Poland. As other features of the British Neolithic cultures are paralleled on the opposite shores of the North Sea, it would not be surprising if the practice of flint-mining was among them. In the present state of knowledge no firm conclusion can yet be reached on this matter.

After the Neolithic Period

Mining at Grime's Graves probably ceased soon after 1900 B.C. but the discovery of a tanged bronze spearhead in a knapper's floor may indicate some activity on the site until about 1500 B.C. To this part of the Bronze Age has been attributed the mound termed "Grimshoe" at the south-east angle of the mined area. Although this has been regarded as a round barrow thrown up over a cremated interment, the evidence is not very convincing and Canon Greenwell may have been right in thinking that it was a dump of material excavated from a pit. During the Middle Bronze Age sandstorms were common in this area and sand-dunes formed on part of the site, while blown sand helped to fill up the abandoned mine-shafts.

A few centuries later, probably in the 7th or 6th century B.C., this sandy surface was occupied by Late Bronze Age people, and traces of them have been noted in at least nine places, mainly on the south side of Grime's Graves. The most intense occupation was recorded from a hollow in the sand-dunes, termed by the excavators the "Black Hole", where a deposit of ash $9\frac{1}{2}$ feet thick, resulting from wood-fires, was discovered. From this and adjacent excavations came considerable quantities of broken pottery, animal bones, rough flint tools, bone skewers and occasionally bronze tools such as axes, saws and tweezers. These Late Bronze Age folk clearly dwelt on the site and made their flint tools from some of the debris left by the Neolithic miners. Apart from this, the nature of their activity on this site, without any apparent water supply, is not so clear. One may surmise that their presence at Grime's Graves was in some way connected with their farming activities. The scale of this Late Bronze Age occupation suggests the residence of only a family or two.

The next trace of occupation is in the latter part of the Iron Age, perhaps in the 3rd and 2nd centuries B.C., when a few typical potsherds were left on the site. There is a similar scatter of Roman pottery and bronze brooches of the late 1st and 2nd centuries A.D. Small parties collecting flint blocks

or lumps of chalk for building purposes may have been responsible for these relics.

The only archaeological evidence for later visits to the mines consists of a jet chessman of the 11th or 12th century. It is amusing to speculate how this playing piece came to rest in such a remote spot; perhaps a member of the Hundred Court was relieving the boredom of a tedious discussion.



Chalk "cup" used as a lamp by the miners

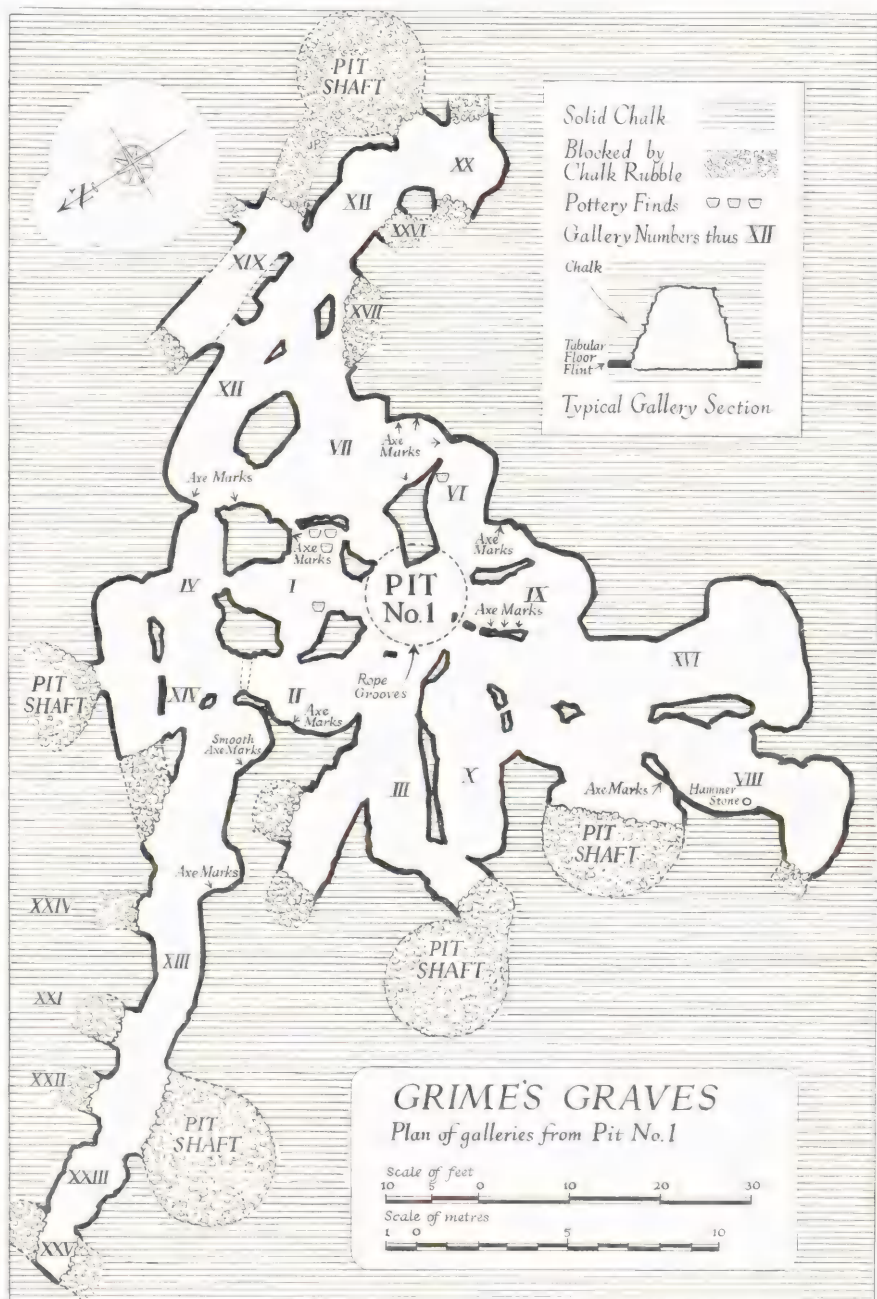
Description

Most of the shafts excavated have now been filled in or have collapsed but two mines (Pits 1 and 15) are open to inspection. Both have been roofed over by the Ministry of Public Building and Works since it assumed guardianship of this important site in 1931. Access to the shaft and galleries is by a trap-door in the roof and a metal ladder leads to the base of the pit. An electric torch is a useful accessory for those wishing to crawl along the galleries, and old clothes are also advised.

Pit 1 is 30 feet deep from the ground surface. In descending the ladder the successive layers of boulder clay, "topstone", soft chalk with "upper crust" and hard chalk with the band of "wallstone" will be noticed in the side of the shaft before the bottom is reached on the level of the "floorstone" (page 12). The "floorstone" as left by the Neolithic miners can be seen close to the entrances of some of the seven galleries which radiate from the bottom of the shaft. By proceeding first north and then west, it is possible to crawl for nearly 60 feet, until the gallery is found to be blocked with chalk blocks, as it was left by the ancient miners and found by the excavators in 1914. The bottom of the shaft is unnaturally gloomy owing to the modern roof.

Pit 15 is only 21 feet deep and the shaft is 16 feet 6 inches in diameter at the base. Eight galleries open from the bottom of the shaft, but all are blocked within a few feet and most do not seem to have been worked further, perhaps because of the poor quality of the "floorstone" in this pit. To compensate for this some of the "wallstone" at the sides of the shaft has been extracted. In the centre of the base of the shaft a pile of flint blocks, on which antlers are laid, has been fenced round, as it forms part of the ritual group already mentioned. Where the fence touches the side of the shaft was formerly the chalk pedestal on which the figurine of the "goddess" was found.

The most important collection of objects excavated from Grime's Graves is in the British Museum, London. Other material of importance from the site can be seen in Norwich, Thetford and Ipswich Museums and a small selection is on view at the custodian's hut.



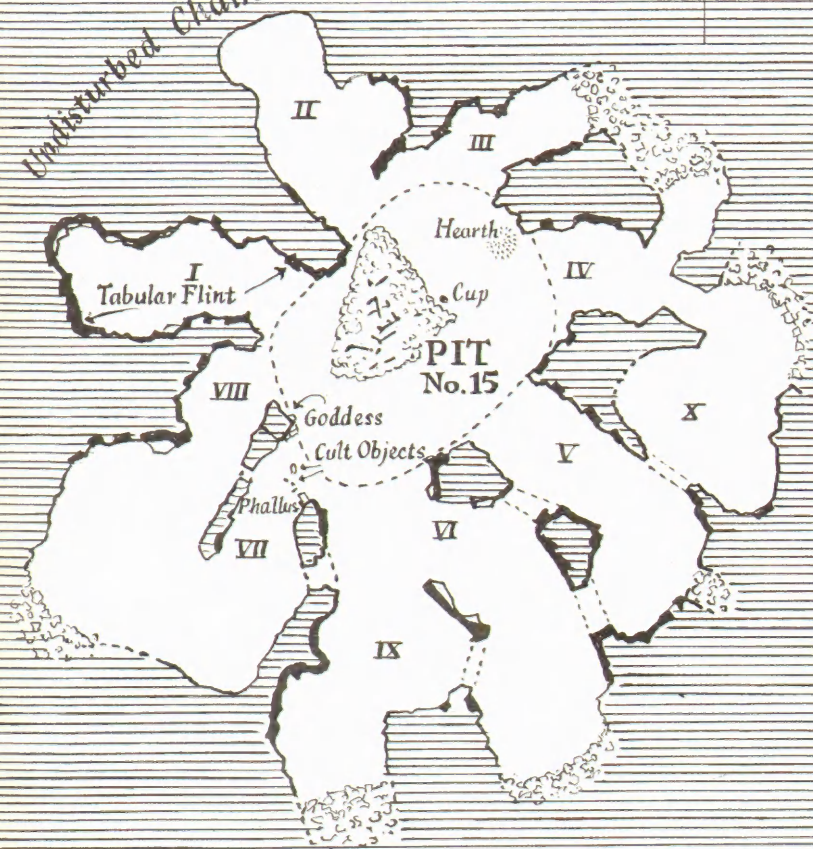
GRIME'S GRAVES

Plan of galleries from Pit No. 15

Gallery Numbers thus VI

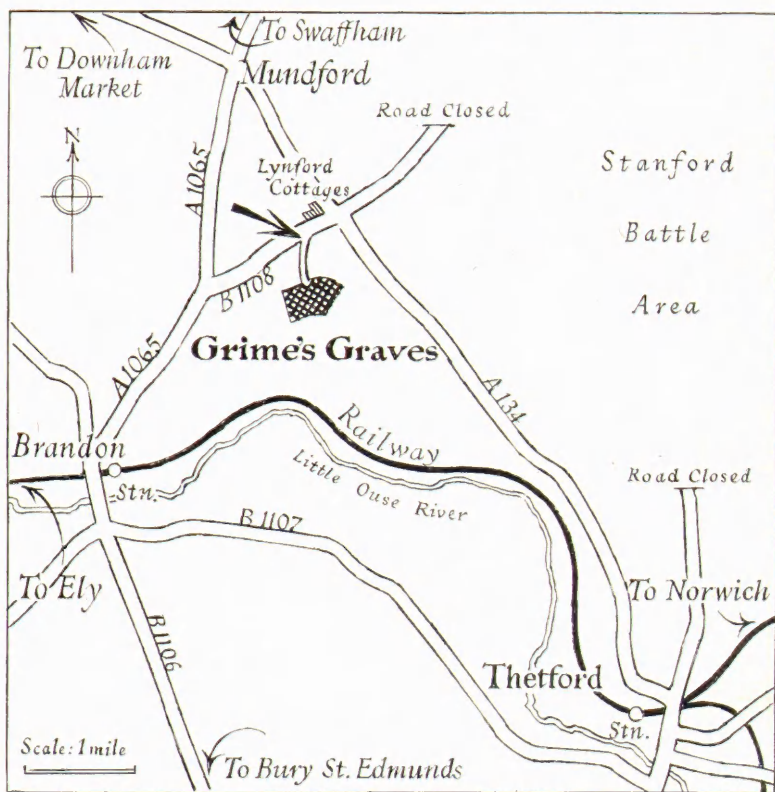


Undisturbed Chalk



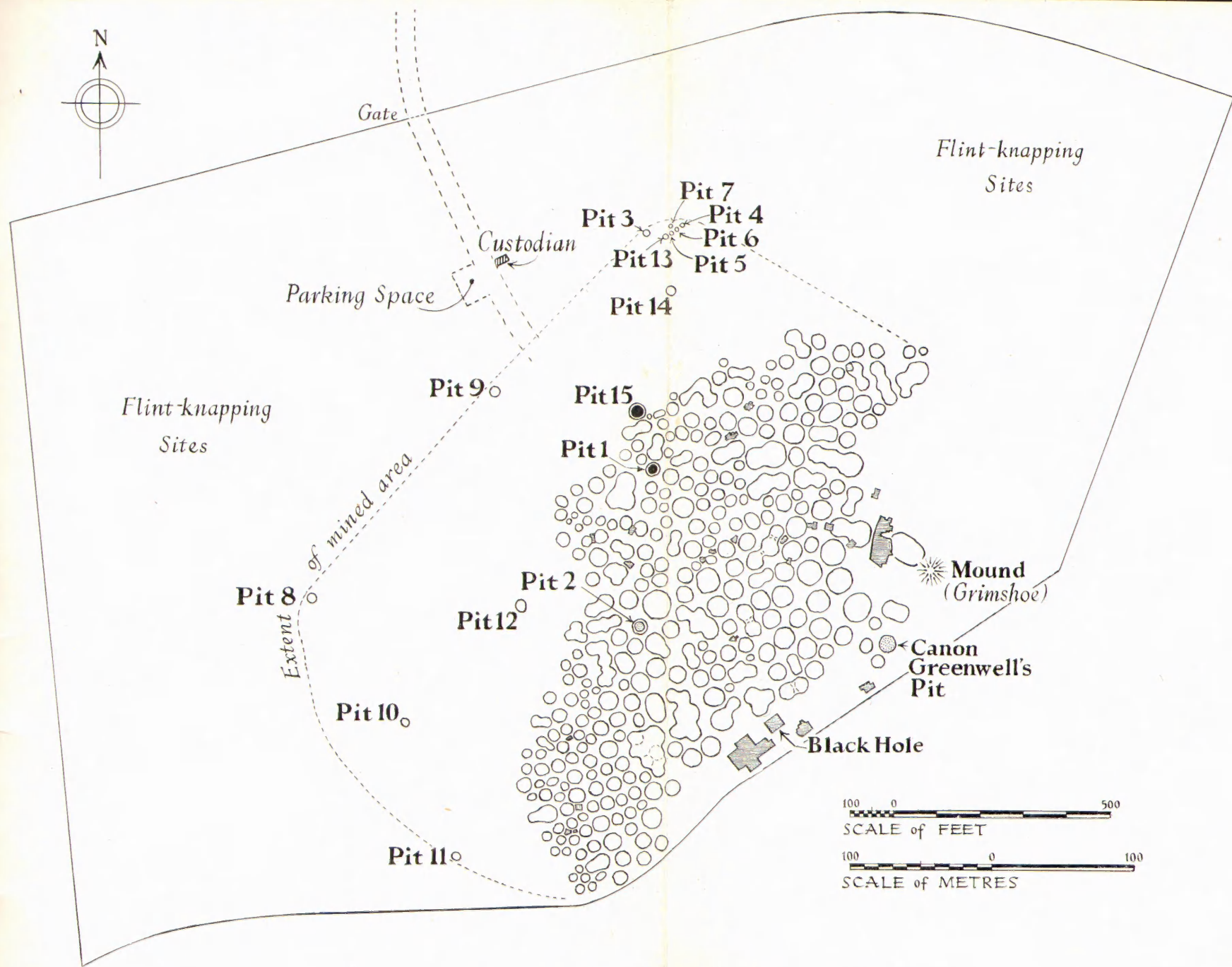
Scale of feet





The position of Grime's Graves

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Grime's Graves—general plan of site

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